SCHOOL HEALTH DATA SYSTEMS RESOURCE
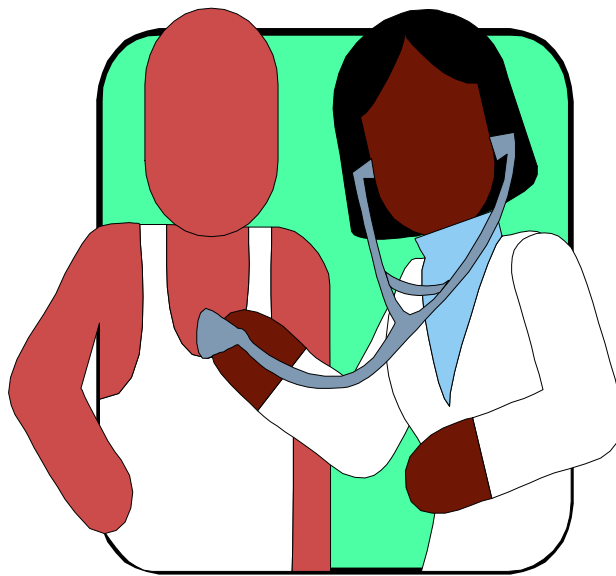
A Resource Guide For Implementing
School Health Management Information Systems

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Acknowledgements

This publication is also available on the Massachusetts Department of Public Health web site:

www.magnet.state.ma.us/dph/

For additional printed copies of this report, please contact the OSE administrative assistant at:

Massachusetts Department of Public Health
Bureau of Family and Community Health
Office of Statistics and Evaluation
250 Washington Street, 5th Floor
Boston, MA 02108-4619
(617) 624-5536

1. INTRODUCTION

A. Rationale for Report

The Massachusetts Department of Public Health (Bureau of Family and Community Health, Office of Statistics and Evaluation) has prepared this report in response to requests from Massachusetts school districts for guidance about the procurement of school health software packages and the implementation of school health management information systems (MIS). School districts face a variety of challenges in evaluating school health software. First, while school nurses are far more computer literate than they were a few years ago, few have developed the level of computer and information systems expertise necessary to evaluate and compare all of the technical specifications, network capabilities, and implementation requirements of the various software packages. In addition, few MIS staff have developed the working knowledge of school health services necessary to understand *fully* user needs and functional requirements. Furthermore, little comparative or evaluative information about school health software is available, and even comprehensive listings of software packages are difficult to obtain. In addition, no single vendor dominates the market for school health software, so districts cannot simply choose the most popular software package with the expectation that the industry standard will be a safe choice for their district. Moreover, because school health software has been improving rapidly, it may seem prudent for school districts to wait for newer, improved versions before making large investments installing and configuring their systems. At the same time, the current school health software packages are now so easy to use and offer so many advantages in program planning, monitoring, and reporting that the purchase of some software package is becoming increasingly essential.

This resource guide is intended to serve as a tool and launching point for school districts in their computerization of school health records. Information is provided on key characteristics of currently available school health software options, and on how to choose and implement a school health computerized information system.

B. Background

There are few sources of population-wide data on the health of school-aged children. However, this data is critical for the following purposes:
- Conducting local, state, and national needs assessments
- Monitoring state-mandated programs and screenings
- Monitoring compliance with Title V reporting and other federal data requirements
- Directing program planning, management, and policy development
- Assuring follow-up services after problem identification
- Conducting process and outcome evaluations

Schools are one of the primary sources of information about the health of children because of the central role that schools play in children's lives. Computerizing school health records facilitates data collection, data management, and access control. It makes the data more comprehensive and accurate, while at the same time providing for increased accessibility for health personnel together with heightened security against unauthorized access.

In recent years, school health data collection and analysis have become a key part of the development and implementation of the Massachusetts Department of Public Health's child and adolescent health promotion and primary care program activities. In 1993, the Massachusetts Department of Public Health received funding from the U.S. Department of Health and Human Services, Maternal and Child Health Bureau to develop, and explore the feasibility of implementing, a state-wide computerized school health information system. With this grant, the Bureau of Family and Community Health within the Massachusetts Department of Public Health, in collaboration with the Massachusetts Department of Education and the departments of public health and education in the other New England states (Region I), developed the prototype Model School Health Information System. During this time, the state decided not to develop its own school health software, but to help schools choose their own instead. In order to provide assistance to districts as they made their software purchase decisions, the state initiated a review of school health software and distributed a report containing its findings to interested districts in 1994. We have updated and expanded the 1994 report in this current report.

In Massachusetts, an additional effort to expand and standardize the collection of school health data has been underway since 1993 as part of the Massachusetts Department of Public Health's Enhanced School Health Services (ESHS) program. This program provides funding to selected school districts so that they can expand and improve basic school health services to address the complex and diverse health needs of students and their families. In order to monitor and document services provided and progress achieved, these schools collect and report a variety of information. Computerization of the data enables schools to more efficiently manage the information, enhances their ability to access and utilize the information locally, and streamlines data-reporting to state agencies. Eventually, computerized school health databases located in each district may be able to update related state-wide databases such as the Massachusetts Immunization Information System. The Massachusetts Department of Public Health provides technical assistance to these sites to facilitate computerization through such activities as the generation of this school health data systems resource guide, and providing consultation in the planning, implementation, and maintenance of school health information systems. As we have gained more experience in data collection and school health information systems, we have become more knowledgeable about software choices and systems implementation issues. Through this report, we hope to share what we have learned and to help facilitate the computerization of school health records and information.

C. Overview of Report Content

The section on **Guidelines For Implementing School Health Management Information Systems** provides some basic guidelines that are critical to consider for thoughtful

implementation of school health management information systems. Our recommendations are based upon Massachusetts' experience in developing the prototype Model School Health Information System and in managing information systems for the state's Enhanced School Health Services Program for over four years.

School districts need to recognize that implementing a school health management information system involves more than just the purchase of software and hardware. There are a variety of factors that determine whether a given software/hardware implementation will be successful over the long run. These success factors include data integration capabilities, data exchange capabilities, software customization capabilities, the availability of training and technical assistance, staffing requirements, the use of backup and other system maintenance procedures, and measures to ensure the security and confidentiality of school health data.

The security and confidentiality of school health data is a subject of increasing importance to communities and must not be ignored. In this section we discuss permanent student identifiers, limiting access to school health records, security of the central database (if one exists), record storage, security of documentation at local schools, authorization and training of staff, security of data transmission, and security of data reporting.

In the section entitled **Considerations for Selecting a Software Package**, we discuss the key considerations districts should take into account when purchasing school health software. We address the following issues: suitability of the system design, costs (of software, installation, training, and maintenance), ease of use, and functional capabilities.

Finally, one of the major goals of this report is to provide information that can help school nurses, administrators, and MIS personnel choose the school health software package that best meets their needs. In order to make it easier to compare and contrast the features of the various software packages, we have presented in the section **Software Comparisons** the key software features and functional capabilities in tabular form. Software packages are listed in the rows of the tables in alphabetical order, and specific features are listed in columns and have been grouped into functional categories:

- Vendor Contact Information
- Software Pricing and Licensing
- Software and Hardware Requirements
- System Design, Security, and On-line Help
- Types of Data Screens Available
- Individual Student Record Elements Available
- Reports and Other Available Functions (injury reports, screening and referral tracking).
- Data Management Capabilities (including data integrity checking, end-of-year processing, the ability to upload and download data),

D. How To Use This Report

Those who intend to purchase school health software will find this report helpful in improving their understanding of the steps involved in setting up school health information systems and to find general information about software packages that might meet their needs.

In particular, this report may be used:
- To help school districts narrow the possible software options to those packages that are capable of being used on their existing hardware and software platforms.
- To identify the type of hardware that would need to be purchased in order to run a particular software package.
- To help identify, clarify, and prioritize the software features desired.
- To develop an understanding of the design, implementation, and maintenance of school health management information systems.

While this report can help districts make more informed software purchase decisions, there are additional criteria that districts also need to consider. This report lists features but makes no attempt to evaluate how successfully each vendor has implemented those features, how easy it is to learn how to use the software, how much customization is required in order to install a system in any particular district, or how much districts might have to spend for training and software customization. Therefore, districts should obtain demo disks (and preferably *working* trial copies of the software), consult with their MIS staff, follow-up with the vendors' technical support, and, if possible, talk to nurses and MIS personnel experienced in using and implementing the systems being considered before making a final purchase decision.

Also included are price estimates as provided by software vendors. Please note that these are current estimates and are subject to change.

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2. GUIDELINES FOR IMPLEMENTING SCHOOL HEALTH MANAGEMENT INFORMATION SYSTEMS

School districts intending to computerize their school health records not only need to consider software features but also need to evaluate other factors required for successful systems implementation.   These factors include A) the ability to exchange data with other databases, B) the ability to customize software to meet local needs, C) training and technical assistance, D) staffing requirements, E) system maintenance procedures, and F) data security.

A. Data Integration and Exchange

The capability to easily *integrate*, *exchange*, and *share* data with other databases is a highly desirable feature of school health information systems. Such information exchange is likely to become increasingly important in future years as various state and local databases come on-line and policy-makers seek to utilize all available sources of information to inform decision-making and improve local services.

School health software packages have a user interface (what might be called the "look and feel" of the software) as well as a "relational database" that defines the data structure and format and provides the technology that allows the user to manipulate the data. The same underlying relational database may be used to develop many different types of applications. Open-standard relational databases leave the data in a standard format so that other database software can access it. If the underlying relational database software is proprietary, however, it leaves the data in a non-standard format. Districts may find it useful to identify the database upon which the software package is built (Access, Oracle, SQL Server, for example) and whether it is compliant with a database interface standard called ODBC that can be used by MIS personnel to access the data. School health software that uses a proprietary (non-standard) database may provide limited import/export and data linkage capabilities, and may require the purchase of additional software or custom programming expense if there is no built-in provision for importing and exporting data in standard formats.

Districts may also want to keep track of developments in the School Interoperability Framework (SIF), a recent industry initiative to develop technical specifications for ensuring that the diverse K-12 software applications (including financial management, library, attendance, food service, and health) work together in a simple "plug and play" fashion. SIF provides for standard data formats and naming conventions for shared data, and specifies rules for data interaction. It is intended to eliminate redundant data entry, allow districts to choose the best software applications for their needs and remain confident that all the various applications can "talk to" each other, and make it easier to create powerful data reports that link several databases. SIF has the backing of Microsoft, the Software & Information Industry Association, and a number of school software vendors. As of August, 1999, the SIF specifications were still under development, and no SIF-compliant applications were available. Nevertheless, this is an area undergoing rapid change and development and well worth watching. Current information about SIF can be obtained at the SIF web site: www.schoolsinterop.org/.   School health software vendors do not currently use HL7

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(www.hl7.org/), the clinical and administrative healthcare data interoperability specifications being developed by the American National Standards Institute, which is widely used by laboratories, hospitals, and other large patient care facilities.

Standardized classification of nursing activities can facilitate the computerization of school nurse activities and are useful for data exchange, data aggregation, as well as for detailed research and evaluation purposes. At present, the North American Nursing Diagnosis Association (NANDA) codes and the Nursing Interventions Classifications (NIC) are the most common. A few software vendors incorporate these types of coding systems into their software.

The following are scenarios where data exchange occurs:

When students advance grades or transfer schools: Data exchange capabilities allow users of school health software to, among other things, share school health records electronically between schools within the same district when groups of students change grades, and across school districts when students transfer. The development of a set of core data specifications which provide detailed definitions of common data fields can greatly facilitate database integration and aggregation across districts using different software packages.

When linking student health records with other student records: The most advanced school health software has some provision for integration of school health records with larger school health information systems combining demographic, health status, health service, and attendance data. This type of comprehensive database can facilitate the coordination of care across health service delivery sites including traditional health care settings. In addition, the relationship between school and health indicators can be explored.

When reporting selected data to state agencies: Districts considering purchasing software which integrates administrative and health functions may also want to consider whether their state requires districts to report demographic and related data to state agencies in particular formats. In some states (including Massachusetts), the Department of Education specifies the way demographic (but not health) data elements must be reported; some software vendors provide specialized software modules that meet these requirements.[1] Because some data patterns and trends only become apparent when the data is aggregated across geographic boundaries, additional uses for school data aggregated at the district or state level may be developed in the future, and additional data reporting requirements implemented.

For school systems where data exchange occurs or may occur in the future, school health software that offers data import, export, and database linkage functionality in a variety of common data file formats is preferable. Defining specifications for common data fields may be

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[1] The Massachusetts Department of Education (MDOE) requirements can be found at the following web site: www.doe.mass.edu/edtech/administrative/ims/sims_compliance.html. At the present time, MDOE does not have any technical requirements for school health software. However, districts that are considering using software that includes both administrative and health functions should check with the MDOE to make sure that the portion of the software relevant to the MDOE Student Information Management System is compliant with MDOE requirements

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necessary when files are being transferred between different software packages. Some data integration functionality may already be built in to school health software modules that are bundled together with larger school administrative software packages. Data integration and exchange capabilities should be built into the software package and the licensing agreement and should not require any additional expense for software customization. When considering a software package, qualified technical specialists at school districts should review the data interface specifications and ask the software company about how specific data exchange scenarios can be implemented, and whether there are working models of data exchange among users. This information should be obtained before any contracts are signed to ensure that data exchange needs can be met without additional programming expense. The process of data exchange may take place either in "real time" or in regular batch transfers, but ideally should not require programming skills by school health staff and should not be so complex that it cannot be carried out by school health aides with intermediate computer skills.

B. Software Customization

It is useful to have the ability to easily customize the software by adding data fields for recording additional health services activities or recording medical information. Ideally, adding or modifying data fields should be able to be performed by the user and should not require paying the vendor for technical support or custom programming. In addition, while all packages have some data reporting features, the specific data reports your district requires may not be available in all software packages. Once again, creating custom reports or data queries should be able to be performed by users and should not require custom programming at additional cost.

C. Training and Technical Assistance

While some software packages are easy to use and can be self-taught by those with basic computer competence, other software packages (especially more complicated systems involving health software modules integrated into school administrative packages) require *substantial* training. The district's MIS staff are usually responsible for providing training in basic computer literacy, although they may not be equipped to provide training in health software usage. Districts may need to consider paying for on-site training provided by the software vendor if skilled, computer-literate nurses are not available to take on this responsibility.

Even for those software packages that are easy to learn, training will still be necessary to ensure that all nurses in a district are interpreting health encounters and recording health data in a uniform manner. Our experience in Massachusetts has taught us that nurses frequently interpret and record health data in different ways. Consistency and data quality are essential if meaningful data aggregation, analyses, and interpretations are to be achieved.

Vendor technical assistance by telephone, with short waiting times and at reasonable cost, is also often essential, especially for districts with limited in-house MIS staff, extensive software customization requirements, and/or special data exporting or importing needs. The cost of this service varies considerably among the different vendors. Some software vendors have also

established "user groups" with regular annual meetings in regions where a core group of users exists. It may be useful to ask the software vendor whether such groups exist, as they can be of immense value for learning how to use school health software to its fullest extent.

D. Staffing

In addition to staff required for ongoing training and technical assistance, districts may also need to ensure they have adequate staff for data entry, data cleaning and checking, and data compilation and analysis. Staffing needs in these areas tend to vary substantially by district and with the type of information systems in place. Districts using complex, harder-to-use software packages, or using batch data entry procedures where nurses make written notes of health encounters and then enter data at the end of the day, may require more data and clerical staff. In addition, districts with greater analytical needs may require more analytical and reporting capabilities than those that are built into most school health software packages and will require staff analysts capable of performing the required functions.

E. System Maintenance Procedures

School district MIS managers must make provisions for performing the routine systems administration and maintenance functions that are required for their school health data systems, including managing user IDs and passwords, network maintenance, security monitoring, virus-scanning, archiving of old data, data backup, and system upgrades. In some systems, data backup happens automatically as part of system administration procedures, without any user intervention. In others, it is the users' responsibility to make backups. Security and confidentiality guidelines need to be followed for all backup storage media (tapes and/or diskettes) as well. Security and confidentiality must be guaranteed if backups are stored off site.

F. Security and Confidentiality of School Health Data

Confidential or privileged information about individual students and their families must be carefully protected against unauthorized disclosure at all points of information access, transmission, and storage. Guidelines for maintaining the security of school health data are described below. For a more general discussion of information system security in school systems, districts may also want to consult *Safeguarding Your Technology* (described in the References section of this document), a US Department of Education publication.

i) Access Points

Potential data access points or *locations* may include not only the school nurse's office, but also, in a networked system, school administrative offices. Districts with dial-up, remote access systems need to develop strategies for limiting access to pre-approved users.

Formal data confidentiality and security protection procedures and policies must be put into place for each of these access points so that there is a clear and common understanding of how data should be handled, and who has access to what information.

ii) Secure Record Storage

All paper records and data diskettes should be stored in a secure place that is protected from unauthorized access.[2] This can be a locked filing cabinet, desk or office. Storage must be secure at all times (school days, weekends, vacations, summer). In some school districts, non-nursing staff may have access to health offices during the summer when the nursing staff are typically not there. The security of health records must be maintained at these times. In addition, health records transferred from one school to another should be handled only by authorized health personnel and must not be sent with other school records.

In Massachusetts, state regulations require that "the school principal or his/her designee shall be responsible for the privacy and security of all student records maintained at the school" (State Regulation 603 CMR 23.00). The school nurse, in cooperation with the school principal, must maintain the security and confidentiality of any *health* records stored at the local school. The secure storage of *computerized* health records must be maintained by the school nurse, who must adhere to all computer security rules and protocols, and the MIS director (or the designated systems security staff person), who must provide technical support for overall information system security, user account administration, and system monitoring.

Paper records, diskettes or computer screens should not be left open or in an area where they can be viewed by someone entering the room. It is important to log off from all sensitive computer applications when leaving the computer, even for a short time. All data diskettes should be labeled: *Confidential Data: Unauthorized Use is Prohibited*.

iii) Secure Access to Computerized Records

Computers containing school health data should be secured in the following manner. They should be: a) located in a locked area; b) include a start screen that displays the following message each time the database access is attempted: "This database is confidential: Unauthorized access is prohibited"; c) include password protection for system access and health database access; and d) include a password-protected screen-saver which blocks the screen and only allows the screen to reappear if the appropriate password is typed. Staff responsible for backing up the system should ensure security of backup copies of files.

iv) Security of Paper Documentation at the Local School

Print-outs and other such documents with personal identifiers attached to student information should be stamped *confidential*, locked in file cabinets when personnel are away from their desk/office, and not taken out of the building unless for a home visit. Confidentiality and security must be strictly maintained at these times and documents should be returned to the appropriate files as soon as possible. Moreover, when disposing of these documents, they should

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[2] In Massachusetts, procedures taken to safeguard the security of student records must be done in compliance with the Massachusetts Department of Education regulations governing student record privacy and security (603 CMR 23.05).

be shredded prior to disposal. When sending and receiving faxes containing such data, it is recommended that the sender call the receiver to notify her that a confidential fax has been sent. The receiver can then stand at the fax machine at the time the data is being transmitted to limit unauthorized access.   Secured fax machines located inside health rooms are recommended.

v) Authorization & Training of Staff

Those with access to a school's health information system may include staff in the school nurse's office, other health professionals at the school, and management information system staff. There should be a clear understanding of who has access to what information. Staff who have been authorized to access only school administrative data should not be given access to that portion of the system that contains health data.

All staff with access to computers containing school health data should have on file with their employer a signed Information Security Acknowledgement Form which clearly describes the security rules and protocols. Supervisors should review the information on the form with staff to promote a clear understanding of expectations. By signing the form, staff agree to adhere to the rules and protocols.

vi) Data Reporting

Publications of the data should appear only in aggregate, so that data cannot be linked to individual subjects. Suppression rules should be employed which do not allow the reporting of any data cells with less than five cases.

vii) Centralized Data System Security Features

If situations arise in which districts transfer raw (individual-level) data from local school buildings to a district-wide and/or statewide database, additional security precautions must be observed.[3] We describe these special security procedures below so that those districts or states that choose to develop central repositories for their data will be aware of relevant procedures.

The following procedures promote safe data transmission. When using the U.S. Postal Service to transmit data disks or documents:
- The name of the specific individual to whom the data is mailed should be clearly marked on the item.
- The item should be labeled confidential, only to be opened by an authorized person.
- Sturdy envelopes should be used to minimize the risk of accidental tearing.
- If disks are mailed to the Central Repository, they should be placed in special mailing envelopes designed for disks.
- All data submitted should be encrypted prior to transmission to the central repository.
- Submission by mail or electronic file transfer should be communicated by telephone so that the recipient is looking out for the package.

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[3] Such data transfer has both advantages and disadvantages. Districts or states that choose to utilize this type of data transfer do so in order to analyze their data more completely and to become more informed about the health needs of school-age children in their jurisdiction. However, concerns about the confidentiality of student health records are heightened when records are housed in a *central repository* rather than remaining dispersed at the local level.

Data transfer via unencrypted e-mail over the Internet is NOT recommended for individual-level records or any sensitive information. When transferring data electronically via secure channels on the Internet or other enclosed networks, guidelines should be established regarding how to encrypt data prior to transmission, through what secure channel data will be transferred, and who will be receiving the data.

The following steps to ensure security at the central data repository should be taken in addition to those already put in place at individual school buildings.

- If a network is not being used for data collection or data integration, then the central database should reside on a stand-alone computer system, not network-accessible.
- The computer system should be physically located in an office that can be locked.
- Data is encrypted using a key that is known only by appropriate authorized personnel.
- Access to the central database is controlled through passwords.
- No names or other directly identifying information should be stored as part of the central database. In Massachusetts, the standard for submitting data to the state requires that no identifying information be included once the data leaves the local school system. Over time, a numeric permanent student identifier (PSID), which allows for linking multiple records for a single student, would dramatically increase the depth of data analysis possible. If a PSID system is adopted, policies and procedures should be defined covering how identifiers are assigned and how they follow the student across transfers within and between school systems.

In order to breach security and obtain identifiable data, a person would have to gain physical access to the Central Repository computer, decrypt the database or log on to the database with a valid user ID and password, and be able to identify individual data, despite the absence of identifying fields. Such a sequence of safeguard violations would be rare. Nonetheless, even though no identifying data is being stored in the Central Repository, there is some risk that anonymous data could be associated with an individual. The primary risk points are the date-of-birth and the school building codes. The following steps could be taken to remove even this low level of risk. The date-of-birth and date-of-measurement could be removed from the Central Repository as data is loaded into it, and replaced with a field containing age at measurement. Standard school building and/or school district codes could be replaced by private MIS codes, with the correspondence kept in a secure fashion, outside of the Central Repository database.

Because there can be threats to confidentiality within each step from data collection to transmission, analysis, and reporting, rules should be developed for each point. Similar to the procedures recommended for local schools, only staff authorized to utilize or handle the data should be permitted access to the Central Repository. All employees should be trained on standard procedures to maintain confidentiality. New employees should be trained in procedures as part of their initial training. Annual refresher sessions should be held for all staff.

3. CONSIDERATIONS FOR SELECTING A SOFTWARE PACKAGE

Based upon our experience in Massachusetts, there are many considerations to take into account when purchasing school health software, including suitability of the system design, costs (of software, installation, training, and maintenance), ease of use, functional capabilities, and Year 2000 compliance.

A. Suitability of System Design

i) Stand-alone versus Modular Health Software

A major distinction can be made between 1) specialized, stand-alone school health software, and 2) school health modules designed to be integrated into, and function with, a school's administrative software package (which may keep records of grades, attendance, and discipline, as well as perform functions like class scheduling). Specialized school health software packages typically are designed to be used on a single personal computer, although many now can be networked to some extent – used by multiple users in a school or district. Software modules, on the other hand, generally are designed to work with the school administrative software package published by the same vendor. While some of these modular applications do work on a single personal computer or on a single school network, in many cases they are used on a district-wide network, with a central server (on which the database application and the data reside) connected to networked personal computers at each school building.

ii) Integrated versus Non-integrated Databases

Another important issue is the location of the database in the district. Here, one can distinguish between 1) multiple, non-integrated databases, 2) distributed databases, and 3) centralized database configurations. With multiple non-integrated databases, there is a separate database located at each school building, which contains only records for students attending that school, and which does not have the capability to be automatically linked to a central database. In a distributed database configuration, there is a separate database at each school, but all the separate databases have the capability to be synchronized with a central district-wide database so that an integrated database can be created. In a centralized database, a single master database containing all district records resides in a central district location. The key issue is that the second two configurations allow for an integrated district-wide database, while the first configuration does not.

Many school health software applications were originally designed to be used at only one school building (and not integrated with databases used at other schools in the same district), in part because computers used by school nurses have historically not been connected to a district network. This approach is also simpler and less costly than other configurations. However, creating some type of centralized or distributed district-wide database makes it much easier to perform database administration and data management tasks; transferring records when students

transfer between schools is simplified; changing menu items in drop-down lists can be done centrally to ensure district-wide data consistency; providing passwords and implementing security features for regular and substitute nurses can be handled centrally; producing district-wide data reports and analyses is greatly facilitated; and backup procedures can be performed in a more consistent and uniform fashion by skilled technical personnel.

If multiple non-synchronized databases are used across a district, the routine transfer of records from one school to another would require staff members to perform time-consuming manual data extractions and insertions. Furthermore, if there is no provision for the automatic aggregation of data stored at each school, then producing simple district-wide reports in order to meet state requirements would require that the same reports be run at each school, and then manually combined to produce district totals. This duplication of effort is highly inefficient.

Alternatively, the records at each school could be manually extracted and then imported into an aggregate database for running reports. This "manual extract" process is only slightly more efficient. Fortunately, many school health applications now have some provision for automatically aggregating data across the district on a regular basis (perhaps once per day) using modems or the district network to connect the separate databases to an integrated district database.

However, this often requires the purchase of a separate "district integrator" module as well as computer modems (for those not on a district network). In addition, in very large districts, file synchronization may become a slow and cumbersome process. Some software packages can be used in a variety of different network configurations, while others have very specific requirements. The district's MIS personnel and the software vendors' staff can help determine which software applications are appropriate for the type of network in your district.

iii) Web-enabled Applications

Vendors of school health software are also beginning to offer web-enabled versions of their product for use on intranets, which are private versions of the internet that limit access to authorized users. Like traditional centralized applications described above, web-enabled software stores data in a central location so that the database is always up-to-date, recording changes is relatively easy when a student transfers between schools in the same district, and creating district data reports is much simpler.

In addition, web-enabled versions of school software provide the following advantages: they are platform independent (i.e., it can be used by either a Microsoft Windows personal computer or a Macintosh running Netscape Navigator or Microsoft Internet Explorer); they may be made accessible off-site (from either home or school, depending on the firewall setup); they are easily scalable to large numbers of users, and (according to one vendor) they require less bandwidth than some conventional client/server systems.

Given the growth of interest in web applications and the increasing number of schools with high-speed internet connections, it would not be surprising to see more vendors begin to offer similar products. However, web-enabled applications can be expensive, requiring either that the district set up their own web server, high-speed network connection, pay database licensing fees, and hire a skilled database administrator, or that the district pay someone else for these services. In addition, both networks and the required servers are susceptible to traffic overloads, and response time may be disappointing unless each nurse's workstation has a relatively new processor, ample RAM memory (48 MB or more), and a 56K modem with a dedicated telephone line or (even better) access to a high-speed network connection (such as a T-1 line) through a school network.

iv) Considerations For Choosing a System Design

The choice between specialized and modular software involves a variety of tradeoffs. The modular approach provides easier data integration between health and administrative records and allows MIS staff to focus their resources on supporting a single unified system. These systems can be offered with a wide variety of administrative modules. Some software vendors offer only a few modules, while others provide a quite extensive selection. Districts may want to investigate which software vendors offer the specific types of modules that best meet the broader information systems needs of the district. Modular systems are typically designed around larger-capacity databases capable of supporting more concurrent users, which may be important in districts in which administrative and health users are accessing the same database. However, modular systems are also more difficult and more costly to install and maintain, may require a longer learning period, a greater level of systems and networking support, and a greater initial investment. In addition, while many administrative packages have broad administrative functions they may not offer all the specific health-related functionality of specialized school health software. Finally, many modular packages have harder-to-use user interfaces than specialized school health software, and may be slow if used over district-wide networks.

Specialized school health software packages tend to require a less costly initial investment, tend to be easier to install and use, usually provide for fast access to data (because it is locally stored), and have more health-related functionality. However, several popular specialized school health software packages are actually built from a Microsoft Access database, which, even on high speed networks, typically cannot support more than 20 or 30 simultaneous users.[4] In addition, creating links between school health data and school administrative databases is more difficult with specialized school health software, generally requiring manual importing and exporting of student demographics data on a regular basis (once per year, for example).

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[4] The printed and on-line documentation that comes with Microsoft Access indicates that up to 255 users on a network can open an Access database. However, this figure only represents the number of users who can have the database open, not the number of users who can actually use the database productively to update data and run queries. There is no single number for this, because the maximum number of users depends on the database design and the frequency with which users update and access data. According to one Microsoft publication, an Access database can only support "up to 20 simultaneous users" (Viescas, 1999). Yet another authority suggests that in many cases even this number is too high: " . . . More than 10 users concurrently accessing an Access database can really degrade performance" (Balter, 1997). A knowledgeable representative for a popular Access-based school health software package indicated in a 1999 telephone conversation with one of the authors of this report that their system slows to unacceptable levels at around 30 users.

Some specialized software vendors are taking steps to make up for these shortcomings, however. Some software vendors may develop versions of their software that are built upon larger capacity databases that can be used over a district's wide-area-network, and the growth of distributed database configurations makes the limitations on simultaneous users irrelevant because the data can be synchronized across a district without using a single database. In addition, some specialized software vendors have formed partnerships with providers of school software application "suites," with built-in links to share common demographic data, thus providing some of the added functionality of modular software.

Small school districts with smaller MIS infrastructures and fewer MIS support staff will usually find that specialized school health software applications best meet their needs. Larger school districts can choose either specialized school health software or school health modules. However, because of the volume of data involved, it will be even more important for them to choose an application that provides some way of integrating district-wide school health data. In the largest districts or regions, the scalability offered by web applications is an advantage. In practice, many districts are already using an administrative software package. In these cases, the school health module published by the same vendor and which "plugs into" the existing administrative system is a logical choice, despite the disadvantages of modular systems mentioned above. In Massachusetts, we have noticed that some school districts that started out using specialized school health software have decided to transition to school health modules that work with the administrative software package used by the district.

B. Costs

Software costs are typically based on the number of schools or the number of nurses who will be using the software. Volume discounts are frequently available, and, in some cases, district licenses are available instead of single-site or single-user licenses. Some vendors require only a one-time license fee, while other vendors require an annual license fee every year of use, with possible discounts after the first year. Some software vendors may offer older versions of their software at substantial discounts, although districts should be especially careful to check for Year 2000 compliance before considering these.

Stand-alone school health software packages are typically less costly than health software modules that integrate into school administrative packages because the former costs less to license, install, and maintain. However, costs for health modules are more difficult to define. These software packages may require a quote from the vendor, and will likely depend on not only the size of the district but also the installation, technical support, upgrade, and customization needs of the district. Customization of the software, either upon installation or to meet the changing needs of the district over time, may add significant cost.

Because the cost structure of school health software packages varies widely and changes frequently, districts should obtain the latest pricing information for the software packages that they are considering.

In addition to the cost of the software itself, other costs that districts may need to consider include hardware costs (including workstations and the server, if required), networking hardware and installation (if required), end-user training, annual technical support fees (both in-house and vendor-supplied), network maintenance support, and the additional clerical and other personnel that may be needed for data entry, data checking, and data compilation and analysis.

C. Ease of Use

Differences in the design of the graphical user interface may significantly affect ease and speed of use in busy nurses' offices. This can greatly affect nurses' level of satisfaction with the product and motivation to use the software. With some software packages it is easy to perform data entry as patients are seen; while with others the user interface is so hard to use that nurses find it easier to make paper notes and then do data entry at the end of the day. This may require hiring additional clerical and nursing staff, increasing the effective cost of using the system. In addition, a good, intuitive design that is visually appealing, that requires few mouse clicks, and that has fast screen redraws can greatly reduce learning time and increase user satisfaction.

D. Functional Capabilities

Common functional capabilities include the ability to maintain daily logs of health encounters, to keep and access individual student records, to maintain immunization records, to record health screenings, and to create basic reports.

Software should be capable of logging *all* health services activities and encounters involving both students and staff. The software should also be able to track and maintain health records concerning medications, immunizations, injuries, medical procedures, health screenings, and mental health counseling. Software packages provide a variety of ways of recording specific types of health activities and entering health records. School districts should look for systems that are easy to use (utilizing drop-down lists, for example, increases speed and minimizes typing errors) and can be customized to meet changing local needs.

The capacity to maintain a wide variety of health-related records including data on student demographics, health insurance providers, primary care providers, and emergency contacts is also useful. School health software should also be capable of developing both standard and customized reports on the population served at the local level.

Other less-common functional capabilities that may be offered include built-in validity checks to assure data integrity, the ability to provide graphical reports, and appointment scheduling. School districts that are evaluating software should be aware of the wide variety of functional capabilities that are available. The next section provides a listing of common features and functions that are available in school health software packages; this information is provided in tabular form to help school districts compare and contrast these packages.

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E. Year 2000 Compliance

Many software packages, including school health software, were not designed to correctly handle dates after the Year 2000.   School health software uses dates in a variety of ways, including daily logs, appointment scheduling, immunization history, and data reporting. Therefore, it is essential that any software package that school districts use for recording school health data be Year 2000-compliant, and that districts using older versions obtain a Year 2000-compliant upgrade. School districts should ask vendors whether the software they are using or are considering purchasing is Year 2000-compliant.

4. SOFTWARE COMPARISON

Specialized school health software applications and school administrative applications with significant health functionality are listed in the tables on the following pages.[5] The eight tables include the following types of information:

1. **Vendor contact information**: includes addresses, phone numbers, and web sites. We also list which vendors have created demo disks, and whether they are "fully functional" evaluation versions or simply "slide shows" that show what the application screens look like.

2. **Software pricing and licensing**: describes initial product purchase costs, the pricing structure, annual fees, and support fees.

3. **Software and hardware requirements**: describes the minimum computer configurations needed to run the software and also identifies which packages run on Windows personal computers and which run on Macintosh computers.

4. **Systems design, security and on-line help**: each package is identified as either 1) specialized school health software or 2) a health module that works with a general school administrative software package. District-wide database integration capabilities are also described. We also distinguish between single and multi-level password systems, and identify those applications with on-line help.

5. **Types of data screens available**: describes the types of data entry screens and logs that are available for entering and reviewing data (i.e., individual student records, daily logs, activity logs, inventory logs, medication administration logs).

6. **Individual student record elements available**: describes what features are available as part of the individual student record such as dental records, individual health care plans, family history, emergency contact information, etc.

7. **Reports and other available functions**: additional features provided by each software, such as the ability to generate reports and lists, to automated screening and referral tracking.

8. **Data management capabilities**: comparison of data manipulation functions.

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[5] The information in these tables has been confirmed as accurate by the software vendors as of June, 1999. Since software is constantly being enhanced and pricing changes, school districts should use this information as a starting point for further exploration and always obtain updated information before making software purchase decisions.

VENDOR CONTACT INFORMATION

SOFTWARE TITLE	SOFTWARE VENDOR	PHONE / FAX	WEB SITE / DEMO DISK	ADDRESS
Clinical Fusion	National Center for School-Based Health Info. Systems	(303) 764-8400 (303) 837-2962	www.uchsc.edu/fusion/ index.htm Yes. Slide Show.	1056 E. 19th Ave. B516 Denver, CO 80218
Dyn-O-Mite & Dyn-O-Log	Patient Medical Records, Inc.	(800) 285-7627 (806) 637-4283	www.pmrinc.com Yes. Functional.	901 Tohoka Road Brownfield, TX 79316
EASY-99	Eagle Software	(888) 324-5363	www.eagle2000.com Yes. Functional.	17821 Seventeenth St. Tustin, CA 92780
Educational Caregiver	Tools for Teachers	(207) 324-1732	www.w3.ime.net/ ~deceiver/nurse1. Html Yes. Functional.	RR1 Box 2319 Sanford, ME 04073
EDUNET Student Database System	EDUNET, Incorporated	(412) 344-3390 (412) 344-3413	www.edunet4.com Yes. Available Nov. 1999.	250 Mt. Lebanon Blvd., Ste. 417 Pittsburg, PA 01534
HealthOffice 2000	Healthmaster, Inc.	(888) 714-1400 (248) 960-8908	www.healthmaster.com Yes. Functional and Slide Show.	3162 Martin Road Walled Lake, MI 48390-1627
Modular Management System (MMS 2000)	Computer Resources Incorporated	(603) 664-5811 (602) 664-5864	www.cri.mms.com Yes. Functional.	94 Route 125, P. O. Box 60 Barrington, NH 03825
Nordex School	Nordex International Inc.	(781) 740-4506 (781) 740-1025	www.nordexinter national.com None.	185 Lincoln St. Suite 220 Hingham, MA 02043
Pentamation Open Series	Pentamation Education Systems Division	(610) 691-3616 (610) 691-1031	www.pentamation.com None.	225 Marketplace Bethehem, PA 18018
School Administration Student Information (SASIxp)	NCS Educational Software and Services Division	(781) 337-5454 (781) 337-4320	k12.ncs.com/k12/ school/sasi2.html Yes. Slide Show.	170 Colonel Lovell's Lane, Townhouse 1 Weymouth, MA 02189
School Health Care-Online 4.01	National Center for School-Based Health Info. Systems	(303) 764-8400 (303) 837-2962	N/A Yes. Slide Show.	1056 E. 19th Ave. B516 Denver, CO 80218

Table 1- Page 1

VENDOR CONTACT INFORMATION

SOFTWARE TITLE	SOFTWARE VENDOR	PHONE FAX	WEB SITE DEMO DISK	ADDRESS
School Nurse Assistant Program (SNAP98, MacSNAP)	Professional Software for Nurses, Inc.	(800) 889-7627 (603) 465-3465	www.school-nurse-software.com Yes. Slide Show.	77 Wheeler Rd. Hollis NH 03049
School Office	Specialized Data Systems	(800) 323-1605 (603) 462-1299	www. specdatasys.com Yes. Slide Show.	855 W. Prairie Wheaton, IL 60187
Schoolmaster	Olympia Computing Company, Inc.	(360) 352-0922 (360) 352-0957	www.schoolmaster.com Yes. Functional.	7249 Capitol Boulevard South Tumwater, WA 98501-5519
Skyward Student Management Software	Skyward, Inc.	(800) 236-7274	www.skyward.com None.	5233 Coye Dr. Stevens Point, WI 54481
Star_Base	Century Consultants	(732) 363-9300 (732) 363-9374	www.centuryltd.com None.	300 Main St. Lakewood, N.J. 08701
Student Health Manager 3.53	Expert Computer Integrators	(515) 753-6676 (515) 753-3771	www.ecisw.com Yes. Functional and Slide Show.	24 West Main St., Suite 15 Marshalltown, IA 50158
Student Information Record System	Management Information Group	(602) 951-0211	www.mig.ab.ca None.	1756 E. Greenway Rd., Ste. 2 Scottsdale, AZ 85260
The School Administrator (Version 7.0)	TREVLAC Computer Services Ltd.	(800) 363-3633 (519) 238-6770	www.trevlac.com None.	P.O. Box 1120 45 Ontario St. Grand Bend, Ontario, Canada
Welligent	Center for Pediatriatric Research + others	(757) 668-6500 (757) 668-6575	www.welligent.org None.	905 Redgate Ave. Suite 102 Norfolk, VA 23507
Win School, Mac School	Chancery Software Ltd	(800) 999-9931 (604) 294-1233	www.chancery.com None.	Suite 275 -3001 Wayburn Drive Burnaby, BC V5G 4W1, Canada

Table 1- Page 2

SOFTWARE PRICING AND LICENSING

SOFTWARE TITLE	PRICE FOR FIRST SCHOOL*	PRICE FOR EACH ADDITIONAL SCHOOL*	PRICE FOR TECHNICAL ASSISTANCE*	DISTRICT LICENSE
Clinical Fusion	Single user: $750 + $150 required annual fee. Network: add $250 per PC + annual fee of $45.	Discount of 10% -30% off the $750 price. Annual fees additional.	Fee-based phone support ($150 per year), includes unrestricted phone assistance.	No
Dyn-O-Mite & Dyn-O-Log	$599 for Dyn-O-Mite; $399 for Dyn-O-Log. Priced per concurrent user.	$499-$599 (Dyn-O-Mite); $299-$399 (Dyn-O-Log). Or, add $100/school if only using 1 PC.	Price includes 60 days phone support. Email support always free. $159 - $189 per user per year for toll phone support.	No.
EASY-99	$5,000 (elementary) - $10,000 (high schools)	$5,000 (elementary) - $10,000 (high schools)	Fee-based toll-free phone support: $1000 - $2,000 for first year.	No
Educational Caregiver	$79.00	$189.00 for 3 users; $276.00 for 5 users	Free E-mail assistance.	Yes. $399 (unlimited use)
EDUNET Student Database System	$4,900 (required base package) + $3,850 (medical records module).	Same as for first school. Call for additional information.	90-day toll-free phone support included. Annual maintenance fee @ 18% of license fee (optional).	No
HealthOffice 2000	$800 per concurrent user, 1-time license fee (up to 750 students). $125 (@ 250 additional students).	$800 per concurrent user (750 students). Optional database for merging district data: $990.	Price includes 1 year phone support. $150/year thereafter (optional). Training: $900/day + travel expenses.	No
Modular Management System (MMS 2000)	$3,900 (for base system + health module). $400 extra for Massachusetts DOE SIMS compliant module.	Roughly 10% discount from price for first school. Free software for district central office.	Several fee-based support & upgrade plans are available (including phone, e-mail, and remote control support).	No
Nordex School	Required base module: $1,600 (single-user), $2,400 (multi-user); Health: add $1,280 (single-user). Other packages	Same as for first school. District-wide data integrator: add $8,080.	Fee-based phone support. On-site training available.	No.

Note: Price estimates are provided by the software vendor and are subject to change.

Table 2- Page 1

SOFTWARE PRICING AND LICENSING

SOFTWARE TITLE	PRICE FOR FIRST SCHOOL*	PRICE FOR EACH ADDITIONAL SCHOOL*	PRICE FOR TECHNICAL ASSISTANCE*	DISTRICT LICENSE
Pentamation Open Series	Call for information	Call for information	Fee-based. Installation, training, phone support, and on-line problem diagnosis.	Call for info.
School Administration Student Information (SASIxp)	Call for information	Call for information.	Fee-based toll-free phone support, internet links, and fax support service.	No
School Health Care-Online 4.01	Call for information	Call for information	Fee-based phone support.	Yes
School Nurse Assistant Program (SNAP98, MacSNAP)	$699 (Single user license). $799 (multiple user license).	$649.00 (Single user license). $249/school and $150/user (multiple user / network license).	Price includes 1 year of phone support. $110 to $350 per year thereafter.	No
School Office	$1,700 per district (standalone health module). $14,000 (complete package).	Discounts negotiable.	Fee-based toll-free phone and internet support.	Yes
Schoolmaster	$2,500 - $5,800, depending on enrollment & grade level. Annual license fee: $500-$800 after first year.	Same as for first school.	Purchase price includes 5-8 hrs. training & support via toll-free phone.	No.
Skyward Student Management Software	Call for information	Call for information	Toll-free phone support.	Yes
Star_Base	Software: $10 per student. Annual fee: approx. 20% of software fee.	Same as for first school.	Fee-based toll-free phone support. On-site training workshop available. Annual fee approx. 20% of license fee.	No

Note: Price estimates are provided by the software vendor and are subject to change.

Table 2- Page 2

SOFTWARE PRICING AND LICENSING

SOFTWARE TITLE	PRICE FOR FIRST SCHOOL*	PRICE FOR EACH ADDITIONAL SCHOOL*	PRICE FOR TECHNICAL ASSISTANCE*	DISTRICT LICENSE
Student Health Manager 3.53	$550 per building (single-user or network)	$100.00	Fee-based support and program enhancements: $200 for 1st school, $75 each additional.	No
Student Information Record System	Call for information	Call for information	Fee-based support contracts are required of all users.	Call for info.
The School Administrator (Version 7.0)	$750 (Basic Program; includes health data)	District discount pricing is available.	Toll-free phone support is free first year, $250 thereafter. Training $500/day + expenses.	Call for info.
Welligent	$1,250 (1st year). Annual license fee after year 1: 25% of initial price if district hosts web site, 50% if Welligent hosts.	$1,250 per school or per user (plus same annual license fees as for initial school).	Annual license fee includes phone and email support. On-site training $650/day + expenses.	No
Win School, Mac School	$2,500 per site (core database + health module), up to $8,000 for all components.	Same as for each school (volume discounts available).	Fee-based phone support and internet support.	No.

Note: Price estimates are provided by the software vendor and are subject to change.

Table 2- Page 3

SOFTWARE and HARDWARE REQUIREMENTS

SOFTWARE TITLE	MINIMAL COMPUTER HARDWARE NEEDS	OPERATING SYSTEM	NETWORKABLE
Clinical Fusion	PC: Pentium 233, 64 MB RAM, 2GB hard drive, CD-ROM, laser printer.	Windows 95, 98, NT.	Yes.
Dyn-O-Mite & Dyn-O-Log	PC: 386 or higher processor. Mac: 68020 and higher processor, 8MB RAM, hard drive.	PC: MS DOS or Windows 3.x and higher. Mac: System 7 and higher.	Yes.
EASY-99	PC: Pentium II, 32 MB RAM.	Windows 3.1, 95, 98, NT.	Yes.
Educational Caregiver	A Mac capable of running Filemaker Pro 3.0 or greater. A Windows version is planned.	Mac: Mac OS and Filemaker Pro 3.0 or greater. Soon available for Windows.	Yes.
EDUNET Student Database System	PC: Pentium 120 MHz, 32 MB RAM (for Windows version)	Windows 95, 98, NT.	Yes.
HealthOffice 2000	PC: Pentium 166 MHz (300 MHz recommended), 24 MB RAM (64 MB recommended), 100+ MB free space on hard drive, CD-ROM drive.	Windows 95, 98, NT 4.0.	Yes.
Modular Management System (MMS 2000)	PC: Pentium II 100, 32 MB, 4 GB hd drive. PC Server: Pentium II, 64 MB, 6 GB hd drive. Mac: PowerPC 604e, 32 MB RAM, 4 GB hd drive. Mac Server: PowerPC 604e, 64MB RAM, 4 GB hd drive.	Windows and Mac. Mixed PC/Mac environment supported.	Yes.

Table 3 - Page 1

SOFTWARE and HARDWARE REQUIREMENTS

SOFTWARE TITLE	MINIMAL COMPUTER HARDWARE NEEDS	OPERATING SYSTEM	NETWORKABLE
Nordex School	PC: Pentium or Pentium II processor, 16MB RAM, 25 MB hard drive. Mac: PowerPC processor, 16MB RAM, 25 MB hard drive. Server: 100MB HD.	Windows 3.x, 95, NT. Mac: OS 8.1. Server: Novell, Windows NT, Unix.	Yes.
Pentamation Open Series	Any combination of PCs and Macs. Server running UNIX, NT, Novell; or an Intranet.	Workstations: Windows or Mac OS. Server: UNIX, NT, or Novell.	Yes.
School Administration Student Information (SASIxp)	PC: 486/66, 12MB RAM, 80MB HD. Mac: 68040/33, 12 MB RAM, 80 MB HD. Server: Pentium 133, NetWare 4.x or NT, 48 MB RAM + 1MB for each user above 20, 300MB+ HD. Ethernet or token ring adapter.	PC: Windows 95. Mac: System 7.5. Mixed PC/Mac environment supported.	Yes.
School Health Care-Online 4.01	PC: 486 processor recommended, 4-8 MB RAM, 60+ MB hard drive .	MS DOS and higher.	Yes.
School Nurse Assistant Program (SNAP98, MacSNAP)	PC: Pentium 166 MHz (minimum), PII 266 (recommended), 32 MB RAM, CD ROM. Mac: 68040, 8MB RAM (minimum); 100 MHz PowerPC, 24 MB RAM(recommended).	Windows 95 or Mac.	Yes.
School Office	PC: Pentium 75 MHz, 16 MB RAM (depending on size of database and number of users).	Windows 3.x, 95, NT.	Yes.
Schoolmaster	PC: Pentium 90+ MHz, 32 MB RAM, CD-ROM. Mac: G3 processor Dedicated file server (only needed for multi-user systems): Pentium 100 MHz with 64 MB RAM, minimum, or G3 processor with 128 MB RAM and AppleShare IP 6.1	Windows 3.1, 95, 98, NT. Mac: OS 8.1	Yes.

Table 3 - Page 2

SOFTWARE and HARDWARE REQUIREMENTS

SOFTWARE TITLE	MINIMAL COMPUTER HARDWARE NEEDS	OPERATING SYSTEM	NETWORKABLE
Skyward Student Management Software	PC: Pentium II 350 MHz, 64 MB RAM, 6 GB HD, 24x CD-Rom. NT Server: PII 450, 256 MB RAM, SCSI drive.	Windows 95, 98, NT 4.0. Mac OS.	Yes.
Star_Base	PC: 32 MB RAM. Mac: G3 processor, Virtual PC software. Centralized server.	Windows 95, NT. Server: UNIX	Yes.
Student Health Manager 3.53	Mac: 68030 or faster, 8MB RAM. PC: 486 +, 16 MB RAM (8 MB w/Windows 3.1). Dedicated database server recommended for large installations.	IBM: Windows 3.1, 95, or NT. Mac: Sytem 7.2. Mixed PC/Mac environment supported.	Yes.
Student Information Record System	PC: Pentium 75 MHz, 16 MB RAM. Local area network.	Windows 95, 98	Yes.
The School Administrator (Version 7.0)	PC: Pentium (any), 16 MB RAM, 50MB HD. Mac: G3 processor, Virtual PC software.	Windows 95, 98, NT. Web access through Macs available.	Yes.
Welligent	PC: Pentium 200+, 48 MB RAM, 30 MB HD Mac: PowerPC, 48 MB RAM, 30 MB HD Network connection: 56 K modem, dedicated phone line, or high-speed connection. Web application and database servers (or use of Welligent servers).	Client: Windows or Mac OS. Servers: UNIX or Windows NT running Oracle.	Yes.
Win School, Mac School	PC: Pentium 166+, 32 MB RAM. Mac: 68040 +, 16 MB RAM.	Windows 95 and Mac OS 7.	Yes.

Table 3 - Page 3

SYSTEM DESIGN

SECURITY & HELP

SOFTWARE TITLE	DATABASE FUNCTIONAL & DESIGN FEATURES	TYPE OF DISTRICT-WIDE DATA INTEGRATION	PASSWORD SECURITY	ONLINE HELP
Clinical Fusion	Specialized health software for schools and community clinics. Based on Microsoft Access.	Multiple non-integrated databases. No automatic centralized data aggregation.	Multi-level.	Yes
Dyn-O-Mite & Dyn-O-Log	Specialized school health software. Dyn-O-Mite is for immunizations & screenings; Dyn-O-Log is for daily logs. Version 99 is based on Foxpro (ODBC compliant). Upgraded version planned.	Multiple non-integrated databases. No automatic centralized data aggregation.	Single-level.	Yes
EASY-99	School administrative software. Based on Microsoft Access. Limited health functionality.	Multiple non-integrated databases. No automatic centralized data aggregation.	Single-level	Yes
Educational Caregiver	Specialized school health software. Based on Macintosh Filemaker Pro database. Windows version in development.	Multiple non-integrated databases. No automatic centralized data aggregation.	No information available.	Yes
EDUNET Student Database System	School administrative software. Health module available. Based on Microsoft Access database. New Windows version available Fall 1999.	Multiple non-integrated databases. No automatic centralized data aggregation.	Multi-level.	Yes
HealthOffice 2000	Specialized school health software. Based on Microsoft Access. A more costly version based on a larger-scale database is under development.	Distributed database. Automatic centralized data aggregation module (optional).	Multi-level.	Yes.
Modular Management System (MMS 2000)	School administrative software. Health module available. Based on FoxPro database.	Multiple non-integrated databases. No automatic centralized data aggregation.	Multi-level.	Yes

Table 4 - Page 1

SOFTWARE TITLE	DATABASE FUNCTIONAL & DESIGN FEATURES	TYPE OF DISTRICT-WIDE DATA INTEGRATION	PASSWORD SECURITY	ONLINE HELP
Nordex School	School administrative software. Based on FoxPro database. SQL Server and Oracle versions under development.	Distributed database. Automatic centralized data aggregation (optional). Slower centralized capability.	Multi-level	Yes
Pentamation Open Series	School administrative software. Based upon ODBC compliant 4GL database. Web-based reporting option.	Centralized or distributed (with automatic centralized data aggregation).	Multi-level.	Yes
School Administration Student Information (SASIxp)	School administrative software. Health functions included in the basic package; other modules available.	Distributed database. Automatic centralized data aggregation module (optional).	Multi-level.	Yes
School Health Care-Online 4.01	Specialized school health software.	Multiple non-integrated databases. No automatic centralized data aggregation.	Multi-level.	Yes
School Nurse Assistant Program (SNAP98, MacSNAP)	Specialized school health software. Based on Microsoft Access database.	Multiple non-integrated databases. No automatic centralized data aggregation.	Multi-level. (6 levels).	Yes
School Office	School administrative software. Health module available either stand-alone or integrated into a complete package.	Distributed database. Automatic centralized data aggregation module (optional).	Single-level.	Yes
Schoolmaster	School administrative software. Health component included in the basic package. Uses a proprietary database w/ built-in data export.	Distributed database. Automatic centralized data aggregation (optional).	Multi-level.	Yes

Table 4 - Page 2

SOFTWARE TITLE	DATABASE FUNCTIONAL & DESIGN FEATURES	TYPE OF DISTRICT-WIDE DATA INTEGRATION	PASSWORD SECURITY	ONLINE HELP
Skyward Student Management Software	School administrative software.	Centralized database.	Multi-level	Yes
Star_Base	School administrative software. Health module available. Based on Oracle database. Web-enabled version planned.	Centralized database. Web version planned.	Single-level	Yes.
Student Health Manager 3.53	Specialized school health software. Based on FileMaker Pro database. FileMaker Pro Server (for optional client/server setup).	Centralized or multiple non-integrated (no automatic data aggregation.) configurations.	Single level.	Yes
Student Information Record System	School administrative software. Based on the FoxPro database. Unlimited concurrent users. Includes health component.	Centralized database.	Multi-level	Yes
The School Administrator (Version 7.0)	School administrative software. Health included in Basic module. Uses Visual FoxPro database; can also be used in client/server mode with Oracle or SQL Server. Web-enabled feature available.	Centralized (client/server or web) or distributed (w/automatic centralized data aggregation) configurations.	Multi-level	Yes
Welligent	Specialized school health web application. 3-tier architecture based on an Oracle database. Intra/internet use only.	Centralized database. Only available as a Web application.	Single-level	Yes
Win School, Mac School	School administrative software. Proprietary database. Oracle & SQL Server options. ODBC connectivity and web access available for real-time district data module ("Open District").	Centralized ("Open District") or distributed (with automatic data aggregation, "District Integrator" module).	Multi-level.	Yes

Table 4 - Page 3

TYPES OF DATA SCREENS AVAILABLE

SOFTWARE TITLE	INDIVIDUAL STUDENT RECORD	MEDICATION LOG	INVENTORY LOG	STUDENT ACTIVITY RECORD	DAILY LOG
Clinical Fusion	Yes	Yes	Yes	Yes	Yes
Dyn-O-Mite & Dyn-O-Log	Yes	Yes	Yes	Yes	Yes
EASY-99	Yes	No	No	Yes	No
Educational Caregiver	Yes	Yes	Yes	Yes	Yes
EDUNET Student Database System	Yes	Yes	Yes	Yes	Yes
HealthOffice 2000	Yes	Yes	Yes	Yes	Yes
Modular Management System (MMS 2000)	Yes	Yes	Yes	Yes	Yes
Nordex School	Yes	Yes	Yes	Yes	Yes
Pentamation Open Series	Yes	Yes	Yes	Yes	Yes
School Administration Student Information (SASIxp)	Yes	Yes	Yes	Yes	Yes
School Health Care-Online 4.01	Yes	Yes	Yes	Yes	Yes
School Nurse Assistant Program (SNAP98, MacSNAP)	Yes	Yes	Yes	Yes	Yes
School Office	Yes	Yes	Yes	Yes	Yes
Schoolmaster	Yes	Yes	Yes	Yes	Yes
Skyward Student Management Software	Yes	Yes	Yes	Yes	Yes
Star_Base	Yes	Yes	Yes	Yes	Yes
Student Health Manager 3.53	Yes	Yes	Yes	Yes	Yes
Student Information Record System	Yes	Yes	Yes	Yes	Yes
The School Administrator (Version 7.0)	Yes	Yes	Yes	Yes	Yes
Welligent	Yes	Yes	Yes	Yes	Yes
Win School, Mac School	Yes	Yes	Yes	Yes	Yes

Table 5- Page 1

INDIVIDUAL STUDENT RECORD ELEMENTS AVAILABLE

SOFTWARE TITLE	FAMILY HISTORY	SPECIAL EMERGENCY INFO FILES	DENTAL RECORDS	HEALTH CARE PLAN
Clinical Fusion	Yes	Yes	Yes	Yes
Dyn-O-Mite & Dyn-O-Log	Yes	Yes	Yes	Yes
EASY-99	No	No	No	No
Educational Caregiver	Yes	Yes	Yes	Yes
EDUNET Student Database System	Yes	Yes	No	Yes
HealthOffice 2000	Yes	Yes	Yes	Yes
Modular Management System (MMS 2000)	Yes	Yes	Yes	Yes
Nordex School	Yes	Yes	Yes	Yes
Pentamation Open Series	Yes	Yes	Yes	Yes
School Administration Student Information (SASIxp)	Yes	Yes	Yes	Yes
School Health Care-Online 4.01	Yes	Yes	Yes	Yes
School Nurse Assistant Program (SNAP98, MacSNAP)	Yes	Yes	Yes	Yes
School Office	Yes	Yes	Yes	Yes
Schoolmaster	Yes	Yes	No	Yes
Skyward Student Management Software	Yes	Yes	Yes	Yes
Star_Base	Yes	Yes	Yes	Yes
Student Health Manager 3.53	Yes	Yes	Yes	Yes
Student Information Record System	Yes	Yes	Yes	Yes
The School Administrator (Version 7.0)	Yes	Yes	No	Yes
Welligent	Yes	Yes	Yes	Yes
Win School, Mac School	Yes	Yes	Yes	Yes

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REPORTS AND OTHER AVAILABLE FUNCTIONS

SOFTWARE TITLE	CREATE REPORTS AND LISTS	INJURY REPORT	RECORD MULTIPLE DIAGNOSES	AUTOMATIC SCREENING, REFERRAL TRACKING	AGGRE-GATE TOTALS	IMMUNIZA-TION REPORT	PRINT INDIVIDUAL RECORDS
Clinical Fusion	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dyn-O-Mite & Dyn-O-Log	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EASY-99	Yes	No	No	No	No	Yes	Yes
Educational Caregiver	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EDUNET Student Database System	Yes	Yes	Yes	Yes	No	Yes	Yes
HealthOffice 2000	Yes	Yes	Yes	Yes	Yes.	Yes.	Yes.
Modular Management System	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nordex School	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pentamation Open Series	Yes	No	Yes	No	Yes.	Yes.	Yes.
School Administration Student Information	Yes	Yes	Yes	Yes	Yes.	Yes.	Yes.
School Health Care-Online 4.01	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Nurse Assistant Program	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Office	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Schoolmaster	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Skyward Student Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Star_Base	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student Health Manager 3.53	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student Information Record System	Yes	Yes	Yes	Yes	Yes	Yes	Yes
The School Administrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Welligent	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Win School, Mac School	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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DATA MANAGEMENT CAPABILITIES

SOFTWARE TITLE	LETTERS	MAILING LABELS	BILLING	APPOINT-MENT SCHEDUL-ING	DATA INTEGRITY CHECK	END OF YEAR PROCESSING	IMPORT AND EXPORT DATA	GRAPH DATA	CUSTOMIZE FIELDS
Clinical Fusion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dyn-O-Mite & Dyn-O-Log	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
EASY-99	Yes	Yes	Yes	No	No	Yes	No	No	Yes
Educational Caregiver	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EDUNET Student Database System	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
HealthOffice 2000	No	No	Yes	Yes	Yes	Yes	Yes	No	No
Modular Management	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Nordex School	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pentamation Open Series	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No
School Administration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Health Care-Online 4.01	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Nurse Assistant Program	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
School Office	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Schoolmaster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Skyward Student Management	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Star_Base	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student Health Manager 3.53	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student Information Record System	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
The School Administrator	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Welligent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Win School, Mac School	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes

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GLOSSARY

Aggregate Totals: Ability to create reports that aggregate data across classes, schools, districts, or other categories of interest.

Appointment Scheduling: Appointment scheduling allows the school nurse to arrange appointments for the student with any nursing staff member

Automatic Screening/
Referral Tracking: An automated tracking system that points out children who are behind in their immunizations and other health screenings or reminds the nurse to follow up on a referral.

Billing Capacity: The package is able to generate statements for third party billing.

Centralized Database: As used in this report, a centralized database refers to a single master database which contains all district records and which resides in a central district location. Although many applications will in theory run on large networks, few are designed to be used over the slow wide-area-networks that most districts use.

Child Abuse Records: A record of reports of suspected child abuse. This section of the individual student record is often only accessible through a special password system.

Create Reports & Lists: Feature which allows the user to create a list or report based on or aggregated student records. Examples include reports on chicken pox, injuries in specific areas of the school, or a list of the children who are behind in their immunizations.

Customize fields: Allows users to add or change data fields or drop-down selection lists to record information in a way that serves local needs.

Daily Log: A record of the health encounters and events for each day. Very useful for keeping track of student encounters, and for subsequent data aggregation and analysis.

Data Integrity Check: An error-checking feature that works as users enter data to determine if the data meet certain predefined specifications. For example, the program will not allow letters entered where numbers are expected; or it will ask for confirmation if the birth date falls out of an expected range.

Demo disk: A free version of the software program that demonstrates the
                             capabilities of the software package to potential users. Some demo
                             disks are fully functional versions of the software which the user
                             can try out for a limited time or with a limited number of records,
                             while others provide a non-functional "slide show" which only
                             illustrates what the software screens look like.

Dental Records: The individual student record contains a special section for the
                             student's dental health record.

Design: Primarily refers to the distinction between 1) specialized, stand-
                             alone school health software (with nothing but school health
                             functions) and 2) general school administrative software, usually
                             running on a network, that has an optional school health module.

Distributed Database: A system in which there is a separate database at each school in a
                             district, and where all the separate databases have the capability to
                             be automatically linked to or synchronized with a central district-
                             wide database so that an integrated, aggregate database can be
                             created for the district.

District License: When payment of a single fee gives the licensee the right to use the
                             software at all schools in the district.

End of Year Processing: Moving an entire class of children up a grade and the generation of
                             an end-of-year report as well as many other end-of-year operations
                             are accomplished through use of this option.

Family History: A section of the student health record that focuses on family
                             history. Information may include diagnostic categories.

Free Text Comment Area: A section of the individual student record that allows for comments
                             in a free text form such as an in depth record of how an injury
                             occurred.

Graph Data: The program has the capability to graph data, such as heights and
                             weights.

Health Care Plan: A section of the individual student maintains and organizes health
                             care plans designed for children with special health care needs.

Health Screening: The individual student record contains a special section for
                             recording the student's health screenings such as scoliosis, vision,
                             and hearing.

Immunization Report: The individual student record contains a special section for recording individual student immunizations and creating immunization reports. This option allows for recording the date the immunization was given.

Import and Export Data: Information can be imported into or exported out of the database in a standard format, such as text file, that can be read by other software programs.

Individual Student Records: Allows the user to see and access all parts of a student's record to obtain a comprehensive picture of the student's health encounters.

Injury Reports: A section of the individual student record that focuses on injuries. This may include the type of injury, what the student was doing at the time of the injury and the place where the injury took place.

Inventory Log: This log tracks the health unit's inventory for easy record keeping. Inventory may include anything needed to run the nurses office: bandages and other first aid supplies, blankets or even office supplies. This can be used to track returnables such as crutches or cold packs.

Letters: Letters can be created for mass or individual mailings. These letters are based on a pre-designed form or one created by the school nurse.

Mailing Labels: Allows printing formatted mailing labels.

Medication Log: The medication Log keeps a separate record of the medications being dispensed in the school.

Mental Health Records: There is a specific section of the health record that is dedicated to mental health.

Minimal Computer Needs: The minimal computer *hardware* requirements for running the program.

Multiple Non-integrated
Database: A system in which there is a separate database at each school in the district. Each database only contains records for students attending that school. Does not have the capability to automatically aggregate data across the district. Although many applications will in theory run on larger district networks, most are not designed to be used over the slow wide-area-networks that most districts use.

Multiple School Use: Allows the user to record data from several schools on a single computer. Typically used when each school does not have its own computer. There may be a fee for each additional school.

Networkable: The software package is designed to be used by multiple users on a network. Some software applications can only be used on a local network that exists in a single building, while others can be used on a wide-area-network across all schools in the district.

Online Help: A basic help function available to the user which is part of the software itself; it is usually accessed via a help "menu."

Password Security: If the program has a password security system, a password, which is created by the nurse, is needed to gain access to the software system.

Print Individual Records: Allows the user to print reports containing the records of individual students.

Record Multiple Diagnoses: Several diagnoses may be entered for one visit. Each of the diagnosis entered may be used to generate a report or list.

Special Emergency Information Files: This is a file that is quick and easy to access that is outside of the student record. The file contain emergency information such as the phone number of the student's parents and primary care physician

Student Activity Record: A section of the individual student record that keeps track of school activities in which the student participates, such as marching band, sports activities or clubs.

Technical Assistance Available: Telephone help, training, fax-back services, and other assistance.

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(Guidelines written in non-technical language to help educational administrators and staff at the buildings, campus, district, and state levels better understand why and how to effectively secure their organization's sensitive information, critical systems, computer equipment, and network access.)

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